First Five-Year Review Report

for

Dupage County Landfill/Blackwell Forest Preserve Site

Warrenville
Dupage County, Illinois

September 2003

PREPARED BY:

United States Environmental Protection Agency
Region 5
Chicago, Illinois

Approved by:

William E. Muno, Director
Superfund Division
U.S. EPA

Date:

9/3/03

Five-Year Review Report

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List of Acronyms

AOC	Administrative Order on Consent
ARAR	Applicable or relevant and approriate requirement
CD	Consent Decree
CERCLA	Comprehensive Environmental Response Compensation Liability Act
EPA	Environmental Protection Agency
FPD	Dupage County Forest Preserve District
IAC	Illinois Administrative Code
LCS	Leachate Collection System
LFG	Landfill Gas
MCL	Maximum Contaminant Level
MDNR	Michigan Department of Natural Resources
MDEQ	Michigan Department of Environmental Quality
ug/m^3	Micrograms Per Cubic Meter
mg/kg	Milligram Per Kilogram
MNA	Monitored Natural Attenuation
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OCHD	Oakland County Health Department
PCE	Perchloroethylene
ppb	Parts Per Billion
ppm	Parts Per Million
ppm-c	Parts Per Million - Carbon
PRP	Potentially Responsible Party
RD/RA	Remedial Design/Remedial Action
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SVE	Soil Vapor Extraction
SVOC	Semi-Volatile Organic Compound
TCE	Trichloroethylene
TCL	Toxic Compound List
TDS	Total Dissolved Solids
TNMOC	Total Non-Methane Organic Carbon
UAO	Unilateral Adminstrative Order
VOC	Volatile Organic Chemical

Executive Summary

The remedy for the Dupage County Landfill/Blackwell Forest Preserve Site, located in Warrenville, Dupage County, Illinois included 7 major components: 1) Institutional controls in the form of future land-use and groundwater use restrictions; 2) Long-term cap inspection and maintenance; 3) Long-term operation and maintenance of the landfill leachate collection system with possible augmentation; 4) Continued off-site treatment and disposal of landfill leachate; 5) Long-term operation and maintenance of the passive landfill gas venting system with possible augmentation; 6) Monitored natural attenuation for groundwater; and, 7) Long-term groundwater, landfill gas, and leachate monitoring. The site achieved construction completion with the signing of the Preliminary Closeout Report on September 30, 1998. The trigger action for this five-year review was the signing of the Record of Decision on September 30, 1998.

The remedy at the Dupage County Landfill/Blackwell Forest Preserve Site is protective of human health and the environment and exposure pathways that could result in unacceptable risks are being controlled as long as the institutional controls and operation and maintenance activities are maintained.

Five-Year Review Summary Form

SITE IDENTIFICATION

Site name *(from WasteLAN)*: Dupage County Landfill/Blackwell Forest Preserve

EPA ID *(from WasteLAN)*: ILD980606305

Region: 5	**State:** IL	**City/County:** Warrenville, Dupage County

SITE STATUS

NPL status: X Final ☐ Deleted ☐ Other (specify) _____

Remediation status (choose all that apply): ☐ Under Construction X Operating ☐ Complete

Multiple OUs? ☐ YES X NO	**Construction completion date:** 09/30/1998

Has site been put into reuse? X YES NO

REVIEW STATUS

Lead agency: X EPA ☐ State ☐ Tribe ☐ Other Federal Agency _____

Author name: Timothy J. Prendiville

Author title: Remedial Project Manager	**Author affiliation:** U.S. EPA

Review period: February 13, 2003 to July 30, 2003

Date(s) of site inspection: July 16, 2003

Type of review:

X Post-SARA ☐ Pre-SARA ☐ NPL-Removal only
☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead
☐ Regional Discretion

Review number: X 1 (first) ☐ 2 (second) ☐ 3 (third) ☐ Other (specify) _____

Triggering action:

☐ Actual RA Onsite Construction at OU #____ ☐ Actual RA Start at OU#____
☐ Construction Completion ☐ Previous Five-Year Review Report
X Other (specify) Record of Decision Signature

Triggering action date *(from WasteLAN)*: 09/30/1998

Due date *(five years after triggering action date)*: 09/30/2003

Five-Year Review Summary Form, cont'd.

Issues:

Trigger levels need to be developed for the landfill gas emissions from the main vent stack

Site should be considered for deletion from the NPL

Recommendations and Follow-up Actions:

U.S. EPA should work with the IEPA and FPD to finalize the Landfill Gas Trigger Level Report which will establish at what levels additional action may be necessary to ensure that the management of landfill gas emissions at the site remain protective.

U.S. EPA will work with IEPA to identify any remaining concerns at the site and move forward toward proposing the site for deletion from the NPL

Protectiveness Statement(s):

The remedy at the Dupage County Landfill/Blackwell Forest Preserve Site is protective of human health and the environment and exposure pathways that could result in unacceptable risks are being controlled as long as the institutional controls and operation and maintenance activities are maintained..

Other Comments:

None

Five-Year Review Report

I. Introduction

The purpose of five-year reviews is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and recommendations to address them.

The Agency is preparing this five-year review pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The agency interpreted this requirement further in the National Contingency Plan (NCP); 40 CFR §300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The United States Environmental Protection Agency (EPA) Region 5 has conducted a five-year review of the remedial actions implemented at the Dupage County Landfill/Blackwell Forest Preserve Site (the Site), located in Dupage County, Illinois. This review was conducted by the Remedial Project Manager (RPM) from February 13, 2003 to July 30, 2003. This report documents the results of the review.

This is the first five-year review for the Site. The triggering action for this statutory review is the date of the Record of Decision signature as shown in EPA's WasteLAN database: September 30, 1998. This review is required because certain response actions are ongoing and hazardous substances, pollutants, or contaminants are or will be left on site above levels that allow for unlimited use and unrestricted exposure.

II. Site Chronology

Table 1: Chronology of Site Events

Event	Date
Dupage County Forest Preserve District (FPD) buys 40 acre parcel and surrounding acres	1960
Agreement with FPD and County Public Works to construct landfill under FPD supervision	July 1965
FPD assumes responsibility for construction of landfill	1969
1.5 million cubic yards of waste disposed creating Mt. Hoy	1965-1973
Network of monitoring wells installed in and around landfill	1970's
Initial landscaping completed	1975
Mt. Hoy and surrounding recreational areas opened to public	1976
Additional monitoring wells installed	1980's
Leachate seeps mitigated via regrading and erosion control measures	1980's
Gas vents installed in landfill to reduce landfill gas buildup	1982
Quarterly sampling of existing monitoring wells	1983-1989 1990-1991
Site proposed for NPL	June 24, 1988
U.S. EPA and FPD sign AOC for RI/FS	September 25, 1989
Low levels of groundwater contamination detected near Sand Pond (not detected in 1998 re-sampling)	1989

Table 1: Chronology of Site Events

Event	Date
NPL listing	February 21, 1990
RI approved by U.S. EPA	December 1994
FS submitted to U.S. EPA	June 1995
FPD and U.S. EPA sign AOC to complete several components of design and cleanup	March 1, 1996
Remedial Action Start	March 1, 1996
Pre-design Investigation	1996
Leachate Collection System (LCS) construction begins	September 8, 1997
LCS operational	November 1997
Remedial Design Complete	July 1, 1998
Ambient air investigation by Montgomery Watson Harza (MWH) - no unacceptable risk from landfill gas	1998
Construction completion	September 30, 1998
ROD signature	September 30, 1998
FPD certifies restrictive covenants/deed restrictions are in place	June 3, 1999
Final O&M Plan Approved	February 25, 1999
Final Inspection of RA construction	February 24, 1999
First Year Report Submitted- concluded no LCS augmentation necessary	July 2, 1999
Monitored Natural Attenuation Report submitted	December 1999
Final Construction Completion Report approved	August 1999

Table 1: Chronology of Site Events

Event	Date
Landfill gas and leachate collection system augmented - all vents connected to main stack	August 2000
Montoring Well GW-147 installed to confirm absence of plume south of Pine Lake	March 2001
Water seep observed on north side of landfill	May 14, 2001
Phase I prairie restoration begins	Summer 2001
Landfill gas observed bubbling through cover between vents DW-8 and SW-4	June 2001
Landfill Gas Recreational Use Evaluation completed	August 2001
Test trenching to identify source of seep (permeable layer above cap)	October 2001
Surface water collection trench installed in low lying area near tubing shed to eliminate ponding water	May-June 2002
Ambient air sampling at landfill gas location	May 13, 2002
Tubing run regrading begins	June 2002
Construction completion report for surface water collection trench submitted	July 2002
Construction of surface water collection trench completed to address seep	May 2002
Draft Landfill Gas Trigger Level Report submitted	February 2003

III. Background

Physical Characteristics

The Dupage County Landfill/Blackwell Forest Preserve Site ("the Site") is located within the Blackwell Forest Preserve approximately 6 miles southwest of downtown Wheaton, Illinois, near Warrenville, in Dupage County, Illinois. The Site is located in Section 26, Township 39 North, Range 9 East, Dupage County, Illinois.

The Site is an approximately 40-acre landfill centrally located within the approximately 1200-acre Blackwell Forest Preserve. The Dupage County Forest Preserve District ("FPD") owns and manages the Forest Preserve. The boundaries that define the Site (within the greater Forest Preserve) are: on the north and east, the landfill is west of the "C" shaped Silver Lake from Spring Brook on the north and Butterfield Road on the South. The southern boundary extends along Butterfield Road to the intersection of Butterfield Road and the West Branch of the Dupage River, and then north to the intersection of the West Branch of the Dupage River and Spring Brook. The western boundary of the Site is formed by Spring Brook.

Land and Resource Use

The Site is one part of the 1200-acre Blackwell Forest Preserve. The Forest Preserve is open space containing woodlands, grasslands, wetlands and lakes used by the public for recreational uses such as hiking, camping, boating, fishing, and horseback riding. The landfill itself, which is also known as Mount Hoy, is generally used for hiking, however during the winter months it is also used for tubing by the general public. Silver Lake is used for boating and fishing. Sand Pond and Pine Lake, formerly swimming ponds, are no longer used by the general public due to previous concerns regarding possible exposure to contaminants from the landfill. None of these uses for the Site, or surrounding acreage, are expected to change in the foreseeable future.

There are a number of private wells east of the Site. Private well construction logs indicate that many of the private wells are screened in the deeper aquifer which is directly downdgradient of the Site.

History of Contamination

History Prior to Landfill Construction

The 35-acre tract of land that is now the landfill was originally purchased by the FPD in 1960. The surrounding 1,100 acres were purchased during the next five years, with the intent of developing recreational uses after construction of the landfill. Initially, the FPD planned to use a nearby inactive gravel pit for solid waste disposal. However, in 1963 gravel excavations were ongoing in the pit and continued through July 1969. Concurrent with the gravel mining

operation, the nearby lakes were enlarged and deepened. The gravel from the pit was sold to offset the lake construction, recreational projects, and flood control projects. With the mining operation generating revenues, and the large amount of clay removed during the lake improvements that could be used fo. construction of a landfill elsewhere, the FPD abandoned the idea of placing waste in the gravel pit and began development of the landfill in its present location. The intent was to construct a landfill that would limit the effects of waste disposal on the surrounding area, create a hill within the preserve which could be used for recreational purposes, and provide an economical means of constructing the lakes at the preserve.

Concern regarding the suitability of the site for landfilling was expressed by several parties, including the Illinois State Geological Survey (ISGS), the Illinois Sanitary Water Board, and Northeastern Illinois Planning Commission (NIPC) personnel. Concerns regarding the site centered on its geologic and hydrogeologic characteristics, including its position on the edge of the Warrenville cone of depression, extensive sand and gravel deposits in the site area, and the probable hydraulic connection between the recreational lakes and buried refuse. The ISGS suggested that careful engineering procedures would be necessary to develop a secure landfill at the site, so the County Board of Commissioners approved the development of an engineering plan for the project.

Landfill Design and Construction

Original design recommendations were developed by the NIPC. Preliminary design specifications for the landfill were developed by William Rose and Associates (Rose) for Dupage County and submitted in October 1966. It was recommended by Rose that the landfill cover a 35-acre area, that a three-to-one clay to refuse ratio be employed, and that the fill area be constructed as a honeycomb of one-acre cells. Each cell would have a 1.5 foot clay base and a perimeter clay berm 8 to 9 feet in height. Each cell would be filled with two 3 foot lifts of refuse, separated by 6 inches of clay. Each cell would be covered by 1.5 feet of clay, which would form the base of the overlying cell. The cells were to be offset, to maximize stability in the landfill design. The cover design specified a final 12 foot layer of compacted clay, covered by soil and vegetation. A leachate collection system was to be installed.

The landfill construction was performed as a joint effort between the Dupage County Public Works Department (PWD) and the FPD. Under agreement between the agencies, the PWD was to build the landfill, under supervision by the FPD.

Construction of the landfill commenced in 1965. By 1967, the shape of the hill and the general cell layout had been determined. The original landfill cell configuration consisted of eight cells. A ninth cell that was eventually constructed was not part of the original design.

The original layout for the landfill was generally followed. Daily records were not kept to detail how the construction proceeded. However, it was the general procedure to develop cells several acres in size by building side berms, and then filling the cells with refuse and daily cover. At the completion of each cell, clay covers and side berms would be constructed for the next

level of refuse. The clay covers served as the liners for the overlying cells.

Significant deviations from the original design are known to have occurred. During the gravel operations which predated the landfilling, a drainage ditch had been excavated between the south end of Silver Lake and Spring Brook. This ditch was later partly filled with concrete, logs, and brush. This is known as Cell 9. Cell 8 of the landfill may have been partially constructed over this ditch. Boring logs from the landfill vents drilled within Cell 8 indicate that a clay base liner is not present. Additionally, the area northeast of the landfill was designated in the original plans as a non-dumping area. However, refuse was encountered in this area during drilling of vents SV-5 and SV-9. A leachate collection system was not installed.

During construction of the landfill other problems are believed to have occurred. These include:

- Instruction of PWD personnel to disregard FPD instructions and requests
- Failure to cover refuse on a daily basis
- Use of insufficient fill between individual cells
- Use of sand and gravel as cover
- Disregard for design specifications for a period during 1968 when the landfill was operated as an open dump

These problems caused the FPD to terminate association with the project in May 1968. In May 1969, the FPD was assigned responsibility for forming the clay cell bottoms and side berms.

Indications are that several additional cells were added around the 8 original cells to bring the total landfill area to the existing 40 acres. These exterior cells were used for disposing of construction debris and tree trunks and branches. These cells may not have been constructed with clay liners. Cell 9 is an example of one of these cells.

Approximately 1.5 million cubic yards of household refuse and light industrial waste were deposited in the landfill between 1965 and 1973, creating Mt. Hoy which is approximately 150' above the original ground surface. Specific wastes known to be disposed of at the Site include eight thousand tons of dry sludge from the Metropolitan Sanitary District of Greater Chicago, daily trash from the glass manufacturing facility of Owens-Illinois of St. Charles, Illinois, and disposal of plant trash from Kroehler Manufacturing of Naperville, Illinois. An estimated three to four tons of refuse per day were placed in the landfill.

Initial Response

In 1982, gas vents were installed in the landfill to reduce natural gas buildup. A network of groundwater monitoring wells was installed in and around the landfill in the early 1970s. During the 1980s, additional monitoring wells were added to provide pertinent information on both the glacial outwash aquifer and the bedrock aquifer beneath the Site.

The Site was proposed for inclusion on the National Priorities List (NPL) in the Federal Register, Volume 53, Number 122, dated June 24, 1988, based upon a Hazard Ranking score of 35.57 (above the 28.5 threshold for NPL sites). The Site received final listing on the NPL in the Federal Register, Volume 55, Number 35, dated February 21, 1990.

On September 25, 1989, U.S. EPA and the DuPage County Forest Preserve District entered into an Administrative Order by Consent whereby the Respondent agreed to conduct a Remedial Investigation (RI) and Feasibility Study (FS) for the Site. The final RI Report was submitted to the U.S. EPA in 1994, and the Draft FS Report was submitted in 1995.

The monitoring wells were sampled quarterly from 1983 through 1989 and again during the RI in 1990 and 1991 and June 1995. Sampling results showed that the concentration of eleven volatile organic compounds (VOCs) in monitoring wells downgradient of the Site, but still on forest preserve property, exceeded Maximum Contaminant Levels (MCLs), as established under the Public Health Service Act, 42 U.S.C. § 300f to 300j-26, allowed in public drinking water. Two wells near the boundary of the forest preserve property had sampling results that reached or exceeded MCLs during one sampling event. However, the detections were not repeated in the June 1995 sampling.

Monitoring wells downgradient of the Site have shown the presence of the following chemicals migrating from the landfill: trichloroethane, tetrachloroethane, 1,2-dichloroethene, 1,1-dichloroethane, 1,2-dichloroethane, 1,2-dichloropropane, vinyl chloride, benezene, toluene, ethylbenzene, xylene, chlorobenzene, chloroethane, acetone, 2-butanone, 4-methyl-2-pentanone, bis(2-ethylhexyl)phthalate and carbon disulfide.

Sand Pond, located just south of the landfill, was closed to public swimming by the Respondent in 1984 as a precautionary measure. Low levels of contaminants were found in the pond sediments during the RI in 1989. Elevated levels of Site related contaminants were not detected in 1998 sampling. There is no current plan to re-open Sand Pond for swimming.

Leachate seeps were initially mitigated by the Respondent in 1980 by regrading and redirecting runoff and by utilizing erosion control measures. The Respondent historically has pumped leachate from collection manholes and trucked it to the Wheaton wastewater treatment plant for disposal.

IV. Remedial Actions

Administrative Order on Consent

On March 7, 1996, pursuant to CERCLA Section 106, the U.S. EPA and the FPD entered into a Administrative Order on Consent (AOC), Docket Number V-W-'96-C-341, which required the FPD to complete several components of the required design and cleanup of the Site. The purpose of the 1996 AOC was to expedite several response actions at the Site. The 1996 AOC SOW identified a number of activities the Respondent would conduct immediately,

including the following:

- Cap characterization to determine if any areas of the landfill did not have a minimum of two feet of low permeability cover material;
- Making any necessary repairs to the cap to ensure two feet of low permeability material was present above the waste;
- Enhancing the surface drainage from the landfill to guard against the pooling of surface water and to prevent erosion;
- Installation of nine leachate extraction wells to remove liquids from within the landfill to protect underlying ground water;
- Installation of a subsurface pipe system to transport extracted leachate to a central collection tank for storage and transport to a permitted off-site facility for treatment and disposal;
- Installation of a passive landfill gas (LFG) collection system to augment the 25 existing gas vents;
- Providing evidence that trees on the landfill were not in areas where root penetration could allow percolation of precipitation through refuse within the landfill;
- Evaluating the existing monitoring wells and implementing monitoring to ensure that contaminant levels were not increasing or moving in a way that could jeopardize either human health or the environment;
- Providing as-built plans of storm water drainage from the top of the landfill and making necessary modifications to ensure that contaminants from within the landfill were not inadvertently being drained from the landfill to nearby areas of the forest preserve; and,
- Maintaining all components to ensure the continued operation of the systems in the short-term to prevent contamination of groundwater from exceeding MCLs at the Forest Preserve boundary.

Record of Decision

On September 30, 1998, U.S. EPA issued a Record of Decision (ROD) for the Site. The final remedy selected in the ROD builds on response actions implemented under the 1996 AOC which included: cap improvements, installation and operation of a leachate collection system (LCS), off-site leachate treatment, and installation of an LFG management system. The final selected remedy for the Site incorporates both long-term operation and maintenance of previously implemented response actions under the 1996 AOC, as well as the following additional response actions:

- Institutional controls in the form of future land-use and ground water use restrictions;

- Long-term cap inspection and maintenance including storm water and erosion control;

- Long-term operation and maintenance of the landfill leachate collection system with possible augmentation;

- Continued off-site treatment and disposal of landfill leachate;

- Long-term operation and maintenance of the passive LFG venting system with possible augmentation to active gas collection and on-site thermal treatment;

- Monitored natural attenuation for ground water; and

- Long-term ground water, LFG, and leachate monitoring.

The ROD established groundwater cleanup standards based on Safe Drinking Water Act Maximum Contaminant Levels (MCLs), risk-based levels, and State of Illinois criteria for protection of groundwater quality.

The ROD states that the overall strategy for cleaning up the Site includes a combination of early removal actions conducted under the 1996, Section 106 AOC, along with contingent and long-term actions described above. The most significant threat is the leachate, which will continue to be collected, treated and sent off-site for disposal. The leachate was initially addressed through early actions with the installation of a LCS, however, the long-term component had not yet been addressed. The ROD addressed the leachate threat by adding long-term operation and maintenance requirements for the system.

Lower level threats posed by the Site are landfill waste, landfill gas, and contaminated groundwater. The ROD addresses the low level threats posed by the landfill waste and landfill gas through containment. Like the leachate, the landfill waste and landfill gas threats were initially addressed in early actions through cap improvements and the installation and interim operation of a passive LFG venting system. These threats are further addressed by the ROD through long-term operation and maintenance of the cap and the passive gas system. The ROD addressed the threat posed by contaminated groundwater through monitored natural attenuation. Finally, the ROD required contingencies for augmentation of the leachate and LFG systems, in the event the early action components were incapable of meeting the long-term remedial goals of the ROD.

Unilateral Administrative Order

By April 1999, all of the activities required under the 1996 AOC were completed by the FPD. On April 9, 1999, U.S. EPA issued a Unilateral Administrative Order (UAO), Docket Number V-W-'99-C-541 to the FPD. The UAO directed the FPD to perform the selected remedial action described in the ROD, and as discussed above.

Remedial Design

The remedial design was split into three components:

- Installation of the leachate extraction wells
- Design of the Leachate Collection System (LCS); and,
- Cap Repair Design

The leachate extraction wells were installed in June 1996. The design process was completed by the FPD in an expedited process with the LCS design being completed in 1997 and the Cap Repair Design completed by the FPD in July 1998.

Remedial Action

As noted above, much of the remedial action work at the Site was performed under the 1996, Section 106 AOC between the U.S. EPA and the FPD. The AOC identified a number of activities the FPD would conduct immediately, including the following: soil borings to determine if any areas of the landfill did not have the minimum of two feet of low permeability cover material; making any necessary repairs to the cap to ensure the two feet of low permeability material was present above the waste; enhancing the surface drainage to guard against pooling of the surface water and to prevent erosion; installation of nine leachate extraction wells to remove liquids from within the landfill to protect underlying groundwater; installation of a subsurface pipe system to transport extracted leachate to a central collection tank for storage and transport to a permitted off-site facility for treatment and disposal; installation of a passive LFG collection system to augment the 25 existing gas vents; providing evidence that trees on the landfill were not in areas where root penetration could allow percolation of water through the waste within the landfill; evaluating the existing monitoring wells and implementing monitoring to ensure that contaminant levels were not increasing or moving; providing as built plans of the storm water drainage and making any necessary modifiation to ensure storm water is not drained from the landfill into nearby land; and operation of the systems in the short-term.

On February 25, 1998, U.S. EPA conditionally approved the Operation and Maintenance Plan (O&M Plan) for the entire Site. A revised O&M Plan was submitted in February 1999. The FPD has continuously been implementing that plan since that time. Activities performed under the O&M Plan include maintenance of the landfill cover, the LCS and the LFG collection system.

On June 3, 1999, the FPD certified that the required restrictive covenants/deed restrictions are in place and are sufficient to meet the requirements of the 1998 ROD and 1999 UAO. The deed restrictions prohibit any activity that may interfere or damage the remedy, prohibits the use of groundwater underlying the site, limits the use of the property to approved recreational uses, prohibits tampering of containment or monitoring systems, prohibits activities that may damage the vegetated cover, and prohibits ignition sources on the landfill.

On August 4, 1999, the FPD submitted the Final Construction Completion Report which was conditionally approved by U.S. EPA on May 13, 1999. The report documents the completion of construction of the following response actions that were completed between August 1997 and August 1998:

- Repair of Landfill Cap Areas 1 through 4
- Improvement of Surface Water Drainage System in Area 5
- Construction of Leachate Collection System
- Construction of LFG Venting System

The AOC required the repair of the landfill cover, as necessary, to maintain a minimum two-foot thick, low-permeability cover over all deficient areas of the landfill and to ensure that the cover is sloped sufficiently to enhance surface water drainage. A pre-design investigation found that four areas did not meet the minimum thickness requirements, and another did not have adequate drainage characteristics. The FPD performed repairs to the five areas in accordance with the June 1997, "100% Cap Repair Design", which was conditionally approved by U.S. EPA on June 17, 1997.

As part of the revegetation plan for the cover the AOC required the FPD develop a rationale for acceptable cover thickness in combination with specific tree types, and a tree management program that would allow for the maintenance of trees on the landfill in safe areas that would not threaten the integrity of the cover over the refuse. In 2000, the FPD submitted to U.S. EPA the Final Arboreal Study Report which presented a detailed discussion of vegetation growth on landfills, including both trees and native grasses. U.S. EPA concluded that the final report does not provide conclusive evidence that the proposed strategy will not impact the integrity of the landfill cap resulting from woody and herbaceous root vegetation. This is largely because conclusive evidence is not available in the literature on the subject for conditions as specific to this landfill. It was agreed to allow trees to remain in certain areas on the cover where there is more than two feet of topsoil and a monitoring program is maintained to determine whether deep rooted trees may impact the cap.

The FPD developed the Phase I Restoration Plan which identified the limited areas where trees would be retained, along with a 5 year monitoring plan to observe tree root growth, along with a native prairie grass restoration plan. The Phase II Restoration Plan will be developed when an end use strategy for both the landfill and the surrounding forest preserve are finalized.

During the spring and summer of 2001, as part of the Phase I Restoration Plan, the FPD began the conversion of the vegetation on the landfill from Eurasion grasses to native Illinois grasses. Site preparation activities, including selective tree removal began in May 2001 and prairie seed installation occurred in May and June 2001. The First and Second Year Restoration Monitoring Reports concluded that the prairie restoration is progressing as expected and should continue the maturation process over the coming years.

The FPD submitted the Monitored Natural Attenuation (MNA) Report in December 1999. On September 3, 2003, the FPD submitted the "Update on Monitored Natural Attenuation Report". Each report demonstrated that MNA is working at the Site. On January 22, 2001, U.S. EPA approved the January 9, 2001, "Revised Long-Term Groundwater Monitoring Plan". Three rounds of groundwater monitoring have been completed under that work plan in support of the MNA groundwater remedy.

System Operation and Maintenance (O&M)

O&M at the Site is performed in accordance with the February 8, 1999 Final O&M Plan, and the revisions in the October 11, 1999 Final First Year Report, the December 12, 2000 Revised Second Year Report, and the October 10, 2001 Third Year Report on the Leachate Collection and Landfill Gas Extraction System. The landfill cover O&M is also governed by the October 2000, " Phase I Restoration Plan for the Revegation of the Blackwell Forest Preserve Landfill"

General O&M

General O&M involves the inspection and maintenance of security measures around the LCS and LFG components (i.e. fencing, warning signs, vaults, and vault covers), upkeep of access roads, and control of vegetation around the LCS and LFG components. There have been no issues concerning General O&M at the Site.

Landfill Cover O&M

O&M of the landfill cover system includes inspection of the landfill surface, vegetation conditions, and surface water drainage features. Inspections of the landfill cover are performed during the bimonthly monitoring of leachate levels and are documented in inspection forms submitted to U.S. EPA.

Cover inspections have shown that in a few areas differential settlement created isolated low areas where water would pond after rainfall events. In 2001, the FPD placed 30,000 to 35,000 cubic yards of additional soil fill on the southern portion of the landfill to improve Site drainage and then reseeded the area as part of the prairie restoration activities. In June 2002, the FPD regraded low areas in the Tube Run Area by placing additional soil.

The FPD provided additional surface water control by installing a surface water collection trench on the north side of the landfill to control a water seep. Analytical results showed the seep to be surface water and not leachate. The trench was construction was completed in 2002. The trench has successfully controlled the seep along the north side of the landfill. The water from the trench is pumped through the LCS for disposal with the leachate.

Leachate Collection System (LCS)/Landfill Gas Extraction (LFG) System O&M

The inspection and maintenance requirements of the LCS/LFG systems include the following:

- Verifying proper integrity and operation of system components;
- Recording system performance data;
- Scheduling leachate testing, load-out transportation and treatment;
- Responding to alarm conditions; and,
- Performing maintenance and scheduling system repairs and modifications.

V. Progress Since the Last Review

This is the first Five-Year Review to be performed at this site.

VI. Five-Year Review Process

Administrative Components

The PRPs were notified of the initiation of the five-year review on February 18, 2003. The Dupage County Landfill/Blackwell Forest Preserve Site Five-Year Review was led by Tim Prendiville of the U.S. EPA, Remedial Project Manager for the Site and Stuart Hill, Community Involvement Coordinator. Rick Lanham, of the Illinois EPA, assisted in the review as the representative for the support agency.

The review, which began on February 13, 2003 consisted of the following components:

- Community Involvement;
- Document Review;
- Data Review;
- Site Inspection; and,
- Five-Year Review Report Development and Review.

Community Involvement

Activities to involve the community in the five-year review were initiated with a meeting in early 2003 between the RPM and the Community Involvement Coordinator (CIC) for the Site. A notice was sent to a local newspaper that a five-year review was to be conducted. The notice was published on February 13, 2003 in the "Press-Republican Newspaper" and invited the public to submit any comments to EPA. The results of the review and the report will be made available at the Site information repository located at Warrenville Public Library, 28 W. 715 Stafford Place, Warrenville, Illinois, 60555.

The only commentor during the comment period was the site owner, the FPD, which submitted a July 24, 2003 report, summarizing their own review of the remedy and recommendations. The FPD concluded that the remedy is protective of human health and environment and will continue to be protective due to the FPD's commitment to continuing Site O&M. The FPD does not consider further investigations, evaluations, or remedial actions warranted. The FPD further requests that the Site be removed from the NPL following the 5-Year Review process.

Document Review

This five-year review consisted of a review of relevant documents including O&M records and monitoring data (See Attachment 2). Applicable soil and groundwater cleanup standards, as listed in the ROD were also reviewed.

Data Review

Groundwater

Since the start of the Remedial Investigation in 1991 thirteen rounds of groundwater monitoring have been conducted at the Site. A quarterly groundwater monitoring program was performed by the FPD between 1997 and 2000 as part of the two-year Groundwater Monitoring Program as described in the July 1997, "Revised Pre-Design Investigation Report". On January 22, 2001, U.S. EPA approved the FPD's, "Revised Long-Term Groundwater Monitoring Program Report". The first round of groundwater monitoring under the 2001 plan was performed in March 2001. The second round was performed in December 2001 and the third round in September 2002.

The long-term monitoring program consists of groundwater level measurements, and groundwater sampling and analyses. Twenty-six monitoring wells are included in the program, which are divided into:

- Detection monitoring wells located between the landfill and downgradient Site boundary;
- Compliance monitoring wells, located along the downgradient Site boundary; and,
- Other wells/piezometers for water level measurements only

The wells are further divided into those screened in the upper, glacial outwash aquifer and those screened in the lower, limestone bedrock aquifer. The maps in Attachment 3 show the locations of each of the wells. Groundwater samples collected from the Detection and Compliance monitoring wells are sampled on a nine-month schedule to permit detection of seasonal effects on groundwater quality, if any. Following the fifth sampling event modifications to the sampling schedule may be considered.

The groundwater samples are analyzed for volatile organic compounds (VOCs) on the Target Compound List (TCL), phenol, and water quality parameters (i.e., chloride, sulfate, and total dissolved solids (TDS)). Attachment 6 summarizes the detections in the monitoring wells from the September 2002 sampling event. In the September 2002 sampling event only one VOC, cis-1,2-dichloroethene was detected. It was found in well G-127 at 16.6 parts per billion (ppb) and well G118 at 8.9 ppb, well below the cleanup standard of 70 ppb. The only parameter found to exceed a federal or state standard was total dissolved solids. The federal secondary maximum contaminant level (MCL) TDSwas exceeded in five of the tested wells, however the standard is not health based and not enforceable at this site.

A review of historic data indicate that the number of VOCs in groundwater samples is decreasing with time. During the first round of sampling in the RI in September 1991, a total of seven VOCs were detected within nine monitoring wells. In the September 2002 sampling only one VOC, cis-1,2-dichloroethene, was detected within two wells. The concentrations of the detected VOCs is also decreasing over time. In January 1992 the maximum concentration of cis-1,2-dichloroethene was 120 ppb. In September 2002 the maximum concentration was 16.6 ppb.

Monitoring well G147 was installed in March 2001 to verify the results of groundwater modelling used by the FPD to support natural attenuation. The modelling showed that contaminants would migrate beyond Pine Lake if natural attenuation is not occurring. Two rounds of sampling from this well found no detectable concentrations of contaminant, confirming the assumption that natural attenuation is occurring and sampling of the well was discontinued after the September 2002 sampling event.

Leachate

The LCS incorporates nine extraction wells (EW-1, EW-1A, and EW2 through EW-8), two lift stations, and 25 LFG vents that are used to monitor leachate levels (see Attachment 4). Leachate levels have been measured in 34 wells and vents on a monthly basis from January 1998 to March 2001, and on a monthly basis ever since.

Based upon leachate level trend analyses performed in the November 2002, "Fourth Year Report on the Leachate Collection and Landfill Gas Extraction Systems", a majority of wells and vents have shown a continued decreasing trend in leachate levels indicating that the LCS is effectively reducing leachate volume within the landfill. A flat leachate level trendline slope was defined as -0.1 ft/year $\leq$ slope $\leq$0.1 ft/year. Upward or flat leachate level trends occur at several monitoring points. Three such points (SV-8, SV-9, and DV-17) are located in areas influenced by groundwater levels. Two other points (DV-5 and DV-16) apparently are in areas not influenced by the LCS. The trendline analyis also indicates that in areas previously thought to be influenced by the LCS, downward leachate level trends occur in all but three deep vents (DV-8, DV-13, and DV-18, three shallow vents (SV-2, SV-4 and SV-11) and one extraction well (EW-1A).

Through the end of June 2003, approximately 2,938,600 gallons of leachate have been extracted and disposed of since the LCS began operation in 1997. Table 5 of the Fourth Year Report on the Leachate Collection and Landfill Gas Extraction Systems (Attachment 5) summarizes the analytical results for the leachate samples collected from the leachate holding tank. Only four VOCs (acetone, 2-butanone, chlorobezene, and 4-methyl-2-pentanone), six semivolatile organic compounds (SVOCs) (benzoic acid, diethylphalate, dimethylphthalate, phenol, and 3-methylphenol, and 4 methylphenol) were detected in the fourth year of operation.

The September 30, 1998 ROD describes the objectives of the LCS and provides guidelines for system augmentation. The ROD states that the LCS system could be augmented with up to nine additional leachate extraction wells should the LCS be shown not to manage the threat of leachate migration and exposure. Every year since the LCS was installed the criteria have been quantified and reported in the year-end reports. The evaluations have remained consistent over the past five years and indicate that system meets the ROD's criteria for effectiveness and therefore augmentation of the system is not necessary at this time.

Landfill Gas

Landfill gas is monitored bi-monthly with field instruments at the main vent stack and the LFG vents since January 1998 for gas composition, static pressure, velocity, flow rate and temperature. In 2000, twenty-eight LFG vents on the landfill were abandoned or reconfigured so the LFG vents solely from the main vent stack located at the top of the landfill. In addition to the bimonthly field instrument monitoring of LFG, a sample of LFG is collected from the main vent stack at the top of the landfill on a quarterly basis for laboratory analysis. The Summa cannister samples are analyzed for fixed gases including methane, carbon dioxide, oxygen, and nitrogen, and total non-methane organic carbon (TNMOC).

Table 6 from the November 2002, "Fourth Year Report on the Leachate Collection and Landfill Gas Extraction Systems", (Attachment 6) summarizes the LFG analytical results from the main stack vent between September 1998 and April 2002. Attachment 7 is the analytical report for the most recent LFG sample taken from the main stack in April 2003. LFG emissions from the main vent stack increased following the reconfiguration of the system in August 2000 (twelve vents now discharge through the main vent stack). Methane and total non-methane organic compounds (TNMOC) concentrations from the main vent stack have remained relatively constant since the reconfiguration of the vents, On average methane concentrations have been approximately 601,905 parts per million - carbon (ppm-c) and TNMOC has been approximately 1,162 ppm-c. In the April 2003 sample methane was detected at 520,000 ppm-c, and TNMOC was detected at 1000 ppm-c.

In August 2001, the FPD submitted their study, "Landfill Gas Recreational Use Evaluation", as required by the UAO. The purpose of the report was to assess what risks might be posed to recreational users of the Site by continued LFG emissions from the main vent stack, currently the only exposure point that exists. The study included collection of LFG samples from the main vent stack and ambient air dispersion modeling. The LFG sample analysis confirmed

the continued emission of VOCs from the main vent stack. However, the computer modeling showed that the VOC concentrations would disperse below health based levels before reaching any potential receptors. Therefore, the report concluded, the LFG emissions do not pose an inhalation risk to recreational users of the landfill. Methane concentrations at the main vent stack also were found, on average, to be 602,000,000 parts per billion, equivalent to 430,000,000 micrograms of methane per cubic meter of air (ug/m^3), which exceeds the upper explosive limit for methane of 105,900,000 ug/m^3, making the gas unignitable as it leaves the stack. However, as the LFG mixes with air, the mixture dilutes and becomes flammable. Upon further dilution the mixture concentration eventually falls below the lower explosive limit of 105,000,000 ug/m^3. In a December 4, 2001 letter to the agencies, the FPD presented additional air dispersion modeling that showed, under worst case conditions of low wind velocities, the zone in which gases from the main vent stack could be ignitable only exists entirely within the locked, protective steel fence surrounding the vent. The fence is 8 feet tall and a minimum of 4 feet away from the main vent stack. In addition, adequate warning signs are posted around the area prohibiting ignition sources on the landfill. Therefore, it was determined that the main vent stack does not pose an unacceptable risk of fire or explosion. However, IEPA and U.S. EPA requested that the FPD develop an upgrade option to the passive gas venting system based on trigger levels for methane and VOCs. In February 2003, the FPD submitted a Landfill Gas Trigger Level Report to the agencies proposing additional monitoring and potential trigger levels for action should LFG concentrations exceed some standard and pose an unacceptable risk. This report is currently under review by the agencies.

Site Inspection

The inspection at the site was conducted on July 16, 2003. In attendance were the Tim Prendiville, U.S. EPA; Joe Benedict, FPD; Jerry Hartwig, FPD; Ray Badowice, FPD; and Walter Buettner, Montgomery Watson Harza. The purpose of the inspection was to assess the protectiveness of the remedy, including the presence of fencing to restrict access, the integrity of the landfill cover, and general conditions of the site treatment systems.

No significant issues have been identified at any time regarding the soil cover. However, deed restrictions and regular inspections of the area are necessary to ensure the integrity of the cover. The inspection of the treatment building showed no issues. The site in general was in very good condition and undisturbed. No new uses of groundwater were observed. All locks and fences were in good condition. The vegetative cover was in very good condition with no bare spots or stressed vegetation observed. The natural prairie revegetation implemented on portions of the cover was in very good condition. The tubing run that was recently regraded and reseeded was fully covered and in excellent condition.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

The review of documents, ARARs, risk assumptions, and the results of the site inspection indicates that the on-site equipment is functioning as intended by the ROD. There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy. There have been no changes in the toxicity factors for the contaminants of concern that were used in the health assessment, and there have been no changes to the standardized health assessment methodology that could affect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

Operation and maintenance of the landfill cover and drainage structures has been effective. The LFG extraction and LCS both have been effective in the management of potential risks associated with exposure to, or releases of, LFG and leachate. Ambient air sampling at the main vent stack, the only potential exposure point on the landfill to LFG has shown no unacceptable risks. Although no unacceptable risks due to landfill gases emissions currently exist, the FPD is working with the IEPA and U.S. EPA to establish trigger levels for the main vent stack emissions which would govern the need for any augmentation of the main vent stack should the risk-based standards be exceeded.

The 1998 ROD provides for possible augmentation of the LFG extraction system with the installation of up to nine dual leachate and LFG extraction wells. The 1999 UAO also requires that the LFG extraction system manage the threat of LFG buildup, potential migration, and the potential for exposure. As discussed above, the LFG monitoring data do not indicate LFG buildup or migration. Therefore, no further augmentation is necessary at this time.

The February 1999 Final O&M plan specified that a flare would be installed on the main vent stack if the quantity of TNMOC exceeds the set limit of 8 pounds per hour, or 25 tons per year (5.71 pounds per hour) of total VOCs. During the five years of O&M at the Site, the actual emissions ranged from 0.20 to 1.21 pounds of TNMOC per hour. Therefore thermal treatment is not necessary.

The February 1999 Final O&M plan specifies that an active LFG extraction system would be installed if there was evidence of uncontrolled LFG release through or around the landfill cover. In June 2001 following a rainfall event, LFG was observed bubbling through the landfill cover on the north side of the landfill in between LFG vents DV-8 and SV-4. Ambient air samples were collected on May 13, 2002 by the FPD in accordance with the "Proposed Landfill Gas Investigation", which was approved on February 28, 2002. The results showed no significant risks associated with the release. The area was regraded in July and August 2002 and no further release have been observed. An active LFG extraction system is not warranted at this time.

Groundwater data has shown that monitored natural attenuation has been an effective remediation of the aquifer beneath the Site. No contaminants exceed health-based standards at any of the monitoring points, also further supporting the effectiveness of the leachate management system.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of remedy selection still valid?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Changes in Standards

As the remedial work has been completed, all of the ARARs for groundwater and air have been met. The chemical specific ARARs for groundwater are the Illinois Administrative Code (IAC) Class I Potable Resource Ground Water Quality Standards in 35 IAC 620.410, Federal Safe Drinking Water Act Maximum Contaminant Levels (MCLs), 40 CFR 141.11-16; Maximum Contaminant Level Goals (MCLGs) in 40 CFR 141.50-51, and Secondary MCLs in 40 CFR 143.3. A list of ARARs is included in Attachment 8. There have been no changes in these ARARs and no new standards of TBCs affecting the protectiveness of the remedy.

Changes in Exposure Pathways, Toxicity, and other Contaminant Characteristics

The exposure assumptions used to develop the Human Health Risk Assessment included both current exposures and potential future exposures for recreational users, trespassers, employees, and off-site residents. There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment. These assumptions are considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels. No change to these assumptions, or the cleanup levels developed from them is warranted. There has been no change in the standardized risk assessment methodology that could affect the protectiveness of the remedy.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

The ROD determined that there appears to be little risk to ecological communities and or populations in those communities at the Site from organic chemicals in environmental media at the Site. While metals were contaminants of potential ecological concern in some sediment samples they were limited to isolated areas and in surface soils the metals were present at too low of concentration to affect small mammals. No weather-related events have affected the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

Technical Assessment Summary

According to the data reviewed, the site inspection, and the interviews, the remedy is functioning as intended by the ROD. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. All ARARs cited in the ROD have been met. There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment, and there have been no changes to the standardized risk assessment methodology that could affect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

VIII. Issues

Table 3: Issues

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Trigger levels need to be developed for the landfill gas emissions from the main vent stack	N	N
Site should be considered for deletion from the NPL	N	N

IX. Recommendations and Follow-up Actions

Table 4: Recommendations and Follow-up Actions

Issue	Recommend-ations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Trigger levels for main vent stack	Complete development of trigger levels for LFG emissions at main vent stack	PRP	U.S. EPA	06/30/2004	N	N
NPL Deletion	Move forward with proposal for deletion of site	U.S. EPA	NA	09/30/2004	N	N

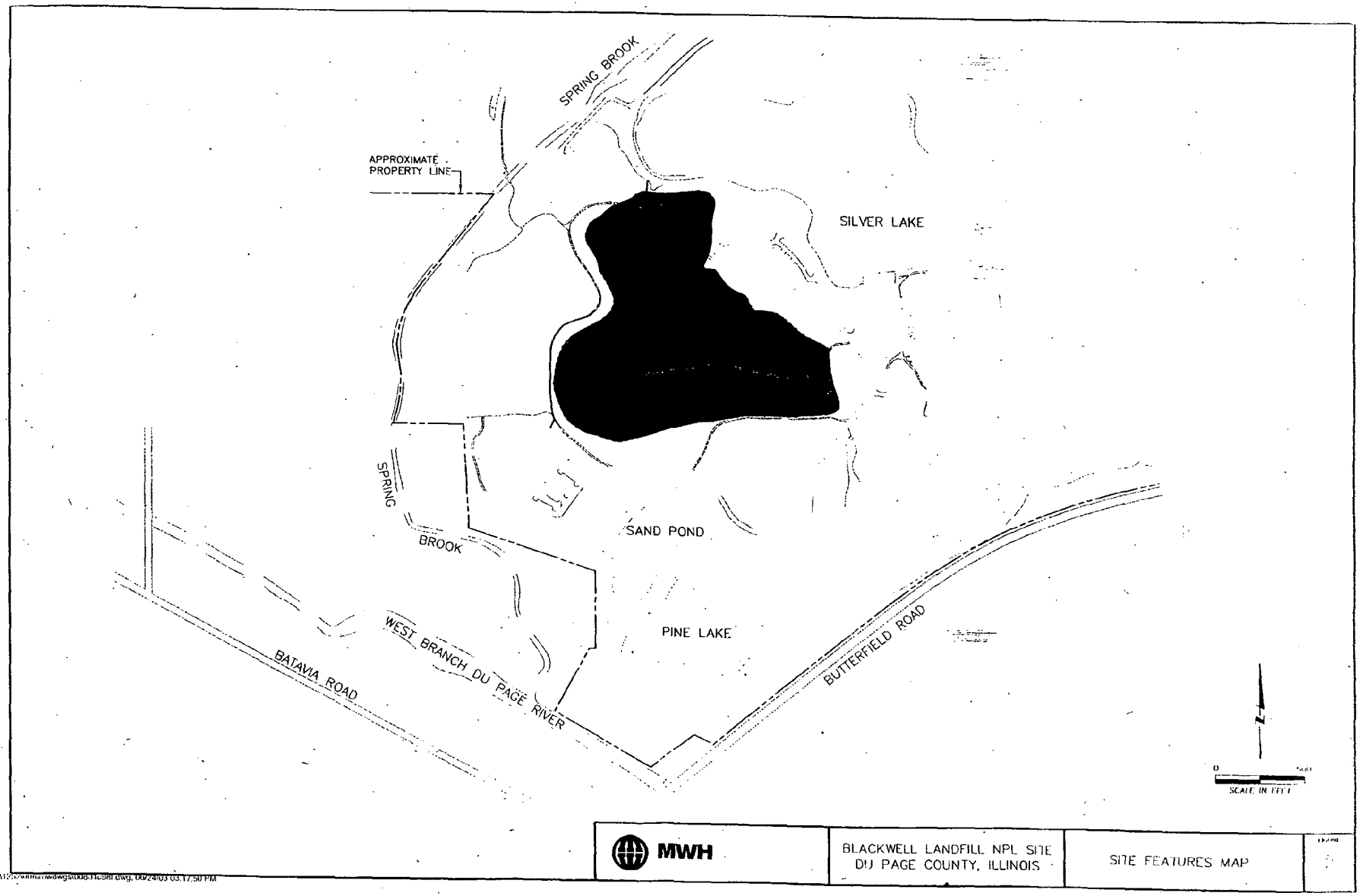
X. Protectiveness Statement

The remedy at the Dupage County Landfill/Blackwell Forest Preserve Site is protective of human health and the environment and exposure pathways that could result in unacceptable risks are being controlled as long as the institutional controls and operation and maintenance activities are maintained.

XI. Next Review

The next five-year review for the Dupage County Landfill/Blackwell Forest Preserve Site is required by September 30, 2008, five years from the date of this review.

Attachment 1



MWH	BLACKWELL LANDFILL NPL SITE DU PAGE COUNTY, ILLINOIS	SITE FEATURES MAP

Attachment 2

Documents Reviewed

MWH, "Fourth Year Report on the Leachate Collection and Landfill Gas Extraction Systems, Blackwell Forest Preserve Landfill Site", November 2002.

MWH, "Final Construction Completion Report, Blackwell Landfill NPL Site", August 4, 1999.

MWH, "Landfill Gas Recreation Use Evaluation, Blackwell Forest Preserve Landfill Site", August 27, 2001.

MWH, "Construction Completion Report for the Surface Water Collection Trench, Blackwell Forest Preserve Site", July 2002.

MWH, "Long-Term Groundwater Monitoring Report, Third Round (September 2002), Blackwell Forest Preserve Landfill Site," December 3, 2002.

MWH, "Long-Term Groundwater Monitoring Report, Second Round (January 2002), Blackwell Forest Preserve Landfill Site," January 30, 2002.

U.S. EPA, "Unilateral Administrative Order for Remedial Action, Docket No. V-W-'99-C-541, April 9, 1999.

MWH, letter report, "Re: Air Dispersion Modeling of Lanfill Gas", April 16, 2001.

Montgomery Watson, "Final First Year Report on Leachate Collection System and Landfill Gas Extraction", October 11, 1999.

Montgomery Watson, letter report, "Re: Water Seep", June 14, 2001.

MWH, letter report, "Re: Water Seep Investigation and Collection Trench Design", December 28, 2001.

MWH, letter report, "Re: Update on Monitored Natural Attenuation Report", September 3, 2002.

MWH, letter report, "Re: Total Dissolved Solids (TDS) Concentrations in Groundwater", February 20, 2002.

Montgomery Watson, letter, "Re: Restrictive Covenants/Deed Restrictions", June 3, 1999.

U.S. EPA, "Preliminary Closeout Report (PCOR)", September 30, 1998.

Montgomery Watson, "Final Construction Completion Report", August 4, 1999.

Montgomer Watson, "Quarterly Groundwater Report, Eighth Round (February 2000)", May 2, 2000.

Montgomery Watson, "Monitored Natural Attenuation Report", December 1999.

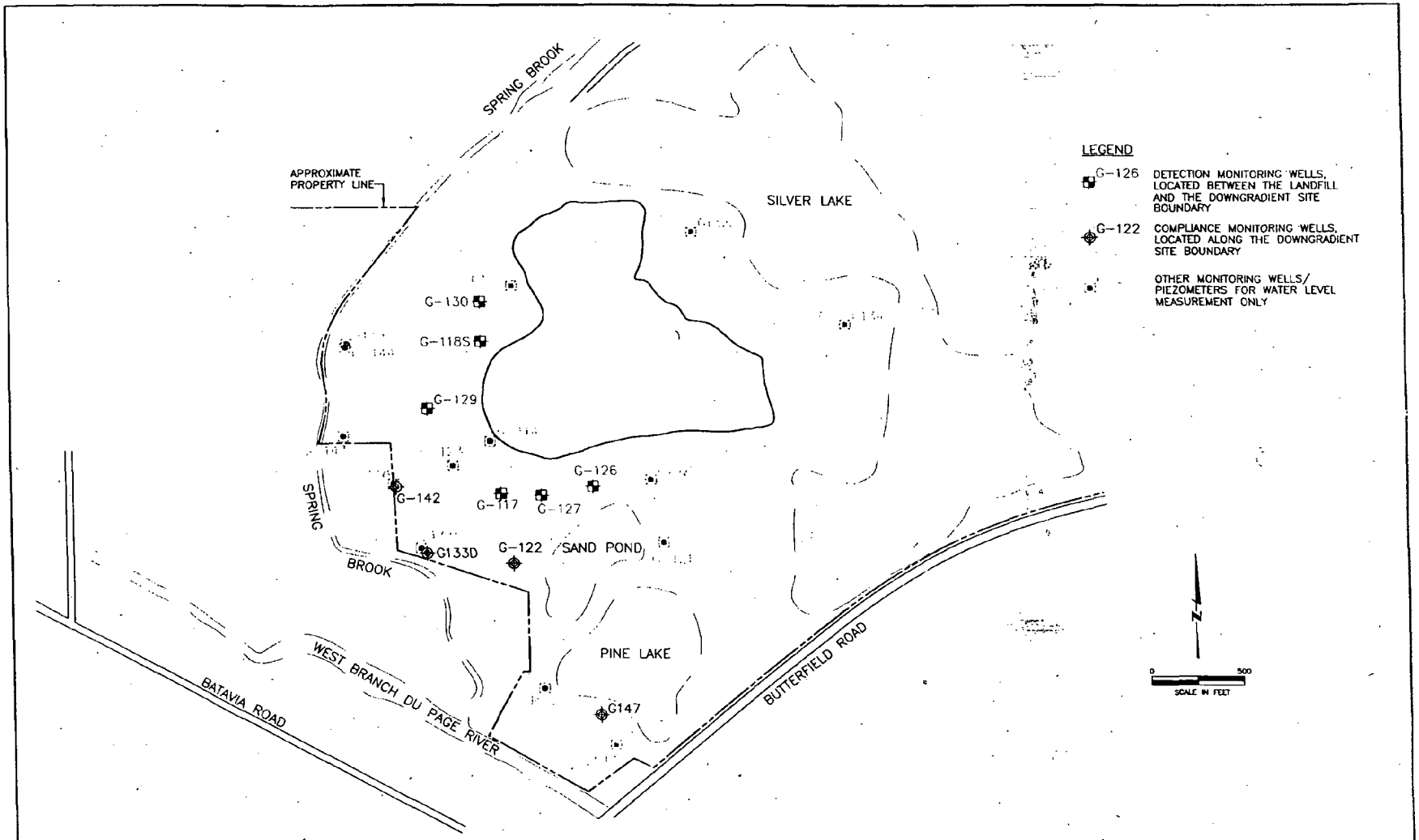
Montgomery Watson, letter, "Re: Response to Comments, Monitored Natural Attenuation Report", December 14, 1999.

MWH, "Five-Year Review of Remedy", July 24, 2003.

Montgomery Watson, "Final Arboreal Study Report", July 2000.

Montgomery Watson, "Final Operation and Maintenance Plan", February 1999.

Attachment 3

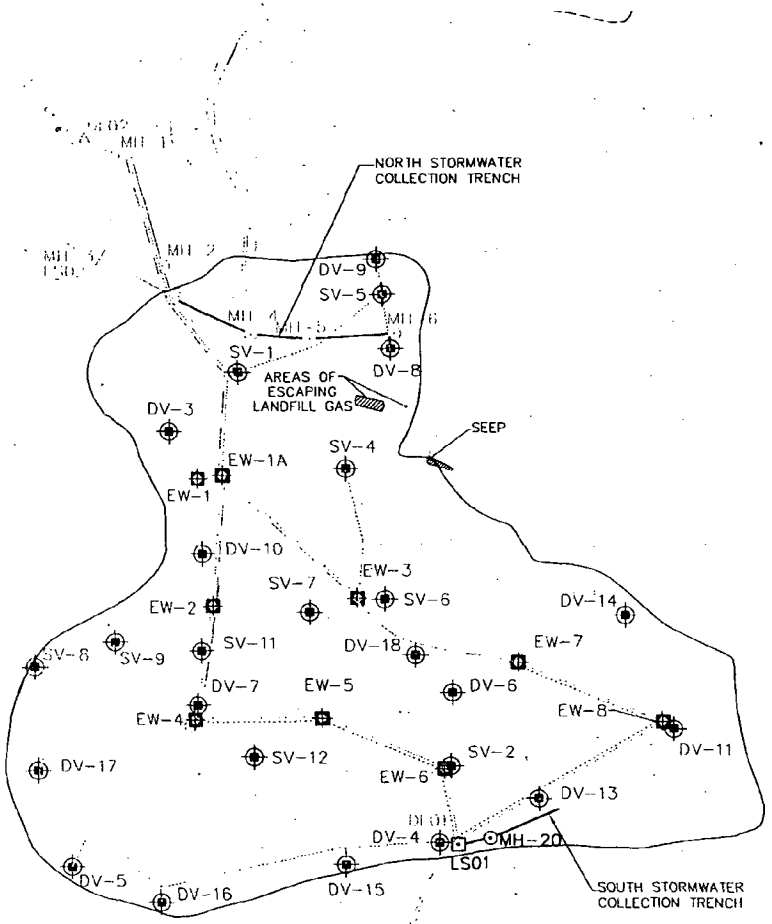


NOTE
BASE MAP DEVELOPED FROM WARZYN INC. DRAWING NO. 6072100-B47, "GROUNDWATER MONITORING WELL SAMPLING LOCATION MAP", DATED JULY 28, 1994.

MWH	BLACKWELL LANDFILL NPL SITE DU PAGE COUNTY, ILLINOIS	GROUNDWATER MONITORING NETWORK	FIGURE 7

J:\1252\008\mwdwg\NEW WELL\long term monitoring 3.dwg, 06/24/03 03:25:15 PM

Attachment 4



LEGEND

- DV-9 — VENT PIPE LOCATION AND NUMBER
- MH-20 — MANHOLE LOCATION AND NUMBER WITH LIQUID CUTOFF TRENCH AND PIPE
- EW-6 — LEACHATE EXTRACTION WELL/GAS VENT LOCATION AND NUMBER
- LIMITS OF REFUSE BASED ON GEOPHYSICAL TESTING AND SOIL BORINGS
- LS01 — LIFT STATION LOCATION AND NUMBER
- LEACHATE PRESSURE CONVEYANCE PIPE AND CONTROL WIRE
- LEACHATE GRAVITY CONVEYANCE PIPE
- GAS HEADER PIPE
- DL01 — DRIPLEG LOCATION AND NUMBER

N

0 250

SCALE IN FEET

NOTES

1. APPROXIMATE LIMITS OF REFUSE HAVE BEEN ESTIMATED BASED ON INFORMATION PRESENTED IN THE PREDESIGN REPORT, APRIL 1997.

MWH MONTGOMERY WATSON HARZA	BLACKWELL LANDFILL NPL SITE DUPAGE COUNTY, ILLINOIS	LCS AND LFG SYSTEMS	FIGURE 1

J:\209\0764 Blackwell\DRAWINGS\LCS and LFG system.dwg

Attachment 5

Table 5
Leachate Analytical Results
Blackwell Landfill NPL Site

Parameter	Units	LLSV8-01 Sep-91	LLDV5-01 Sep-91	Average Sep-91	BW-LCS-01 Dec-97	BW-LCS-02 Jan-98	BW-LCS-03 Feb-98	BW-LCS-04 Jun-98	BW-LCS-05 Sep-98	BW-LCS-06 Dec-98	BW-LCS-07 Mar-99	BW-LCS-08 Jul-99	BW-LCS-09 Dec-99	BW-LCS-10 Apr-00	BW-LCS-11 Jul-00	BW-LCS-12 Oct-00	BW-LCS-13 Jan-01	BW-LCS-14 Apr-01	BW-LCS-15 Jul-01	BW-LCS-16 Oct-01	BW-LCS-17 Jan-02	BW-LCS-18 Apr-02
Conventionals																						
BOD5	mg/L	NA	NA	NA	11,000	10,000	1,530	14,200	29,100	5,940	13,700	3,980	10,700	311	871	4,760	502	448	888	1,460	303	[illegible]
COD	mg/L	NA	NA	NA	15,000	13,300	1,990	19,900	22,900	7,920	22,600	4,440	16,000	969	1,450	5,900	1,080	730	1,590	1,900	1,060	[illegible]
Nitrogen Ammonia	mg/L	464	395	429.5	427	339	58.1	770	1,100	210	739	180	590	140	66.8	380	88	61	190	140	480	280
Oil & Grease	mg/L	NA	NA	NA	526	153	<1	486	<1	31	3	2	9	3	<1	226	6	4	<1	3	<1	[illegible]
pH @ 25 °C	mg/L	NA	NA	NA	6.69	6.61	6.44	6.72	6.72	6.42	6.71	7.03	6.85	7.02	6.94	7.53	6.87	7.61	7.72	6.92	7.4	7.01
Phenol	mg/L	NA	NA	NA	0.44	1.76	0.43	3.09	5.7	1.46	3.2	0.7	2.5	0.28	0.18	0.83	0.13	0.13	0.37	0.54	0.18	[illegible]
Total Dissolved Solids	mg/L	12,700	5,690	9,195	13,200	11,400	2,550	18,260	21,000	6,850	23,300	4,920	16,900	3,290	3,490	6,780	2,440	2,460	4,101	3,970	6,130	6,820
Total Suspended Solids	mg/L	NA	NA	NA	417	476	224	2,040	215	264	1160	200	827	185	48	206	102	35	145	548	22	[illegible]
Cyanide	mg/L	ND	0.007	0.0035	NA	0.014	<0.005	<0.025	<0.025	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	[illegible]
Fluoride	mg/L	NA	NA	NA	NA	NA	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hardness	mg/L	NA	NA	NA	NA	NA	1330	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate+Nitrite	mg/L	3.18	0.06	1.62	NA	NA	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phosphorus	mg/L	NA	NA	NA	NA	NA	0.08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	725	41	383	NA	NA	192	NA	NA	NA	NA	NA	NA	NA	NA	NA	140	NA	NA	NA	NA	NA
Inorganics																						
Arsenic	mg/L	0.045	0.045	0.045	0.008	<0.002	<0.002	<0.002	<0.004	<0.002	<0.004	NA	<0.04	<0.002	0.004	0.004	<0.002	<0.02	<0.002	<0.002	0.003	[illegible]
Barium	mg/L	0.612	0.32	0.466	0.273	0.304	0.178	2.02	0.918	0.192	0.578	NA	0.625	0.377	0.218	0.073	0.262	0.069	0.045	0.144	0.161	[illegible]
Boron	mg/L	NA	NA	NA	4.8	3.87	1.24	6.32	7.15	2.26	7.71	NA	6.29	1.65	1.07	3.15	1.06	0.52	0.06	1.34	2.9	[illegible]
Cadmium	mg/L	0.026	0.007	0.0165	0.082	0.051	0.008	0.18	0.049	0.037	0.062	NA	0.092	0.006	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	[illegible]
Chromium	mg/L	0.022	0.144	0.083	0.008	0.01	0.871	0.07	0.022	0.005	0.018	NA	0.021	0.007	0.064	0.009	0.004	0.003	0.008	0.006	0.016	[illegible]
Chromium, Hexavalent	mg/L	NA	NA	NA	NA	NA	<0.005	NA	NA	NA	NA	NA	NA	NA	<0.05	<0.05	<0.05	NA	NA	NA	NA	NA
Chromium, Trivalent	mg/L	NA	NA	NA	NA	NA	0.871	NA	NA	NA	NA	NA	NA	NA	NA	<0.05	NA	NA	NA	NA	NA	NA
Copper	mg/L	ND	0.069	0.0345	<0.01	<0.01	0.025	<0.001	<0.002	<0.01	<0.002	NA	0.297	<0.001	<0.001	0.076	<0.001	<0.001	0.003	<0.001	<0.001	[illegible]
Iron	mg/L	2,120	182	1,151	550	542	89.6	792	552	451	1,010	NA	1,300	68.7	3.3	49	45.5	11.3	4.59	82.4	20.5	[illegible]
Lead	mg/L	0.03	0.396	0.213	0.1	0.066	0.014	0.534	0.138	0.05	0.109	NA	NA	0.027	0.009	0.003	0.004	<0.002	0.003	<0.002	0.008	[illegible]
Manganese	mg/L	30.6	2.86	16.73	8.5	8.72	1.82	13.4	8.71	8.7	14.6	NA	13.8	1.45	2.13	2.15	1.66	0.594	0.562	2.18	0.0131	[illegible]
Mercury	mg/L	ND	0.002	0.001	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.0005	<0.001	NA	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	[illegible]
Nickel	mg/L	0.233	0.186	0.2095	0.131	0.109	0.352	0.218	0.167	0.085	0.214	NA	0.167	0.036	0.023	0.062	0.013	0.012	0.004	0.029	0.063	[illegible]
Selenium	mg/L	NA	NA	NA	<0.02	<0.02	<0.02	<0.002	<0.004	<0.02	<0.004	NA	<0.04	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	[illegible]
Silver	mg/L	0.03	ND	0.015	<0.001	<0.001	<0.01	<0.001	<0.002	<0.001	<0.002	NA	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	[illegible]
Zinc	mg/L	60.5	1.48	30.99	19.9	18.5	2.6	11.2	3.09	16.5	23.8	NA	28.8	2.93	0.5	0.454	0.364	0.19	0.035	0.144	0.248	[illegible]
Volatile Organic Compounds																						
Acetone	ug/L	10,000	49	5,025	2,420	NA	442	NA	12,600	NA	7,710	NA	6,300	NA	NA	NA	NA	NA	428	NA	177	NA
Acrolein	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<100	<100	NA	<100	NA	NA	NA	<5	NA
Acrylonitrile	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<100	<100	NA	<100	NA	NA	NA	<5	NA
Benzene	ug/L	160	27	93.5	26.1 J	NA	25.5	NA	36.2	NA	32	NA	18.01	8.4	5.3	NA	8.6	NA	<5	NA	<5	NA
Bromodichloromethane	ug/L	NA	NA	NA	<50	NA	<5	NA	<5	NA	<5	NA	<5	<5	<5	NA	<5	NA	<5	NA	<5	NA
Bromoform	ug/L	NA	NA	NA	<50	NA	<5	NA	<5	NA	<5	NA	<5	<5	<5	NA	<5	NA	<5	NA	<5	NA
Bromomethane	ug/L	NA	NA	NA	<100	NA	<10	NA	<10	NA	<10	NA	<10	<10	<10	NA	<10	NA	<10	NA	<10	NA
2-Butanone	ug/L	NA	NA	NA	7,410	NA	854	NA	24,300	NA	17,000	NA	22,100	NA	NA	NA	NA	NA	815	NA	180	NA
Carbon disulfide	ug/L	ND	ND	ND	<50	NA	<5	NA	<5	NA	<5	NA	<5	<5	<5	NA	<5	NA	<5	NA	<5	NA
Carbon tetrachloride	ug/L	NA	NA	NA	<50	NA	<5	NA	<5	NA	<5	NA	<5	<5	<5	NA	<5	NA	<5	NA	<5	NA
Chlorobenzene	ug/L	ND	ND	ND	10.6 J	NA	124	NA	20.4	NA	11	NA	<5	25.2	<5	[illegible]	25.8	NA	<5	NA	9.3	NA
Chlorodibromomethane	ug/L	NA	NA	NA	<50	NA	<5	NA	<5	NA	<5	NA	<5	<5	<5	NA	<5	NA	<5	NA	<5	NA
Chloroethane	ug/L	NA	NA	NA	<100	NA	<10	NA	23.4	NA	12	NA	<10	<10	<10	NA	<10	NA	<10	NA	<10	NA
2-Chloroethylvinyl ether	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<10	<10	NA	<10	NA	NA	NA	NA	NA
Chloroform	ug/L	NA	NA	NA	<50	NA	<5	NA	<5	NA	<5	NA	<5	<5	<5	NA	<5	NA	<5	NA	<5	NA
Chloromethane	ug/L	NA	NA	NA	<100	NA	<10	NA	<10	NA	<10	NA	<10	<10	<10	NA	<10	NA	<10	NA	<10	NA
1,1-Dichloroethane	ug/L	180	3	91.5	<50	NA	10.3	NA	9.2	NA	9	NA	<5	<5	<5	NA	<5	NA	<5	NA	<5	NA
1,2-Dichloroethane	ug/L	NA	NA	NA	<50	NA	<5	NA	<5	NA	<5	NA	<5	<5	<5	NA	<5	NA	<5	NA	<5	NA
1,1-Dichlorethene	ug/L	NA	NA	NA	<50	NA	<5	NA	<5	NA	<5	NA	<5	<5	<5	NA	<5	NA	<5	NA	<5	NA
cis-1,2-Dichloroethene	ug/L	NA	NA	NA	116	NA	99.2	NA	43	NA	88	NA	45.2	<5	<5	NA	<5	NA	<5	NA	<5	NA
trans-1,2-Dichloroethene	ug/L	NA	NA	NA	<50	NA	<5	NA	<5	NA	<5	NA	<5	<5	<5	NA	<5	NA	<5	NA	<5	NA
1,2-Dichloroethene (total)	ug/L	280	7	143.5	NA	NA	NA	NA	NA	NA	NA	NA	<5	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	ug/L	ND	ND	ND	<50	NA	14.2	NA	<5	NA	<5	NA	<5	<5	<5	NA	<5	NA	<5	NA	<5	NA
cis-1,3-Dichloropropene	ug/L	NA	NA	NA	<50	NA	<5	NA	<5	NA	<5	NA	<5	<5	<5	NA	<5	NA	<5	NA	<5	NA
trans-1,3-Dichloropropene	ug/L	NA	NA	NA	<50	NA	<5	NA	<5	NA	<5	NA	<5	<5	<5	NA	<5	NA	<5	NA	<5	NA
Ethyl Benzene	ug/L	84	130	107	38.4 J	NA	27.6	NA	38.5	NA	48	NA	42.8	7.2	<5	NA	7.6	NA	<5	NA	<5	NA
2-Hexanone	ug/L	NA	NA	NA	<100	NA	<10	NA	29.6	NA	24	NA	<10	NA	NA	NA	NA	NA	<10	NA	<10	NA
4-Methyl-2-pentanone	ug/L	1,100	28	564	144	NA	61.4	NA	544	NA	472	NA	353	NA	NA	NA	NA	NA	26.4	NA	[illegible]	NA
Methylene chloride	ug/L	NA	NA	NA	<50	NA	41.5	NA	<5	NA	<5	NA	<5	<5	<5	NA	<5	NA	<5	NA	<5	NA

[illegible]
[illegible]
[illegible]

Table 5
Leachate Analytical Results
Blackwell Landfill NPL Site

Parameter	Units	Samples																				
		LLSV8-01	LLDV5-01	Average	BW-LCS-01	BW-LCS-02	BW-LCS-03	BW-LCS-04	BW-LCS-05	BW-LCS-06	BW-LCS-07	BW-LCS-08	BW-LCS-09	BW-LCS-10	BW-LCS-11	BW-LCS-12	BW-LCS-13	BW-LCS-14	BW-LCS-15	BW-LCS-16	BW-LCS-17	BW-LCS-18
		Sep-91	Sep-91	Sep-91	Dec-97	Jan-98	Feb-98	Jun-98	Sep-98	Dec-98	Mar-99	Jul-99	Dec-99	Apr-00	Jul-00	Oct-00	Jan-01	Apr-01	Jul-01	Oct-01	Jan-02	Apr-02
Semivolatile Organic Compounds (Continued)																						
3&4-Methylphenol	ug/L	17,000	5	8,503	229	NA	275	NA	10,100	NA	7,640	NA	6,870	157	380	NA	168	NA	101	NA	234	NA
Naphthalene	ug/L	ND	960	480	<50	NA	<10	NA	866	NA	<300	NA	<100	15	<10	NA	<10	NA	<10	NA	<10	NA
2-Nitroaniline	ug/L	NA	NA	NA	<250	NA	<50	NA	<1,000	NA	<1,500	NA	<500	NA	NA	NA	NA	NA	<50	NA	<50	NA
3-Nitroaniline	ug/L	NA	NA	NA	<250	NA	<50	NA	<1,000	NA	<1,500	NA	<500	NA	NA	NA	NA	NA	<50	NA	<50	NA
4-Nitroaniline	ug/L	NA	NA	NA	<100	NA	<20	NA	<400	NA	<600	NA	<200	NA	NA	NA	NA	NA	<20	NA	<20	NA
Nitrobenzene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	<10	NA
2-Nitrophenol	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	<10	NA
4-Nitrophenol	ug/L	NA	NA	NA	<250	NA	<50	NA	<1,000	NA	<1,500	NA	<500	<50	<50	NA	<50	NA	<50	NA	<50	NA
N-Nitrosodimethylamine	ug/L	ND	ND	ND	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	<10	NA
N-Nitroso-di-n-propylamine	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	<10	NA
n-Nitrosodiphenylamine	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	<10	NA
Pentachlorophenol	ug/L	ND	ND	ND	<250	NA	<50	NA	<1,000	NA	<1,500	NA	<500	<50	<50	NA	<50	NA	<50	NA	<50	NA
Phenanthrene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	<10	NA
Phenol	ug/L	ND	ND	ND	124	NA	111	NA	1,020	NA	1,900	NA	1,280	23	32	NA	25	NA	109	NA	55	NA
Pyrene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	<10	NA
Pyridine	ug/L	NA	NA	NA	<250	NA	NA	NA	NA	NA	NA	NA	<100	NA	NA	NA	NA	NA	NA	NA	88	NA
1,2,4-Trichlorobenzene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	<10	NA
2,4,5-Trichlorophenol	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	NA	NA	NA	NA	NA	<10	NA	<10	NA
2,4,6-Trichlorophenol	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	<10	NA
Pesticides																						
Aldrin	ug/L	NA	NA	NA	<0.05	NA	<0.05	NA	<0.05	NA	<0.5	NA	<0.05	<0.05	<0.05	NA	<0.05	NA	<0.05	NA	<0.05	NA
alpha-BHC	ug/L	NA	NA	NA	<0.05	NA	<0.05	NA	NA	NA	<0.5	NA	<0.05	<0.05	<0.05	NA	<0.05	NA	<0.05	NA	<0.05	NA
beta-BHC	ug/L	NA	NA	NA	<0.05	NA	<0.05	NA	NA	NA	<0.5	NA	<0.05	<0.05	<0.05	NA	<0.05	NA	<0.05	NA	<0.05	NA
delta-BHC	ug/L	NA	NA	NA	<0.05	NA	<0.05	NA	NA	NA	<0.5	NA	<0.05	<0.05	<0.05	NA	<0.05	NA	<0.05	NA	<0.05	NA
Lindane (gamma-BHC)	ug/L	NA	NA	NA	<0.05	NA	<0.05	NA	<0.05	NA	<0.5	NA	<0.05	<0.05	<0.05	NA	<0.05	NA	<0.05	NA	<0.05	NA
alpha-Chlordane	ug/L	NA	NA	NA	<0.50	NA	<0.5	NA	<0.5	NA	<0.5	NA	<0.50	<0.5	<0.5	NA	<0.5	NA	<0.5	NA	<0.05	NA
gamma-Chlordane	ug/L	NA	NA	NA	<0.50	NA	<0.5	NA	<0.5	NA	<0.5	NA	<0.50	<0.5	<0.5	NA	<0.5	NA	<0.5	NA	<0.50	NA
4,4'-DDD	ug/L	NA	NA	NA	<0.10	NA	<0.1	NA	<0.1	NA	<1	NA	<0.10	<0.10	<0.10	NA	<0.5	NA	<0.50	NA	<0.50	NA
4,4'-DDE	ug/L	NA	NA	NA	<0.10	NA	<0.1	NA	<0.1	NA	<1	NA	<0.10	<0.10	<0.10	NA	<0.10	NA	<0.10	NA	<0.10	NA
4,4'-DDT	ug/L	NA	NA	NA	<0.10	NA	<0.1	NA	<0.1	NA	<1	NA	<0.10	<0.10	<0.10	NA	<0.10	NA	<0.10	NA	<0.10	NA
Dieldrin	ug/L	NA	NA	NA	<0.10	NA	<0.1	NA	<0.1	NA	<1	NA	<0.10	<0.10	<0.10	NA	<0.10	NA	<0.10	NA	<0.10	NA
Endosulfan I	ug/L	NA	NA	NA	<0.05	NA	<0.05	NA	<0.05	NA	<0.5	NA	<0.05	<0.05	<0.05	NA	<0.05	NA	<0.05	NA	<0.05	NA
Endosulfan II	ug/L	NA	NA	NA	<0.10	NA	<0.1	NA	<0.1	NA	<1	NA	<0.10	<0.10	<0.10	NA	<0.10	NA	<0.05	NA	<0.05	NA
Endosulfan sulfate	ug/L	NA	NA	NA	<0.10	NA	<0.1	NA	<0.1	NA	<1	NA	<0.10	<0.10	<0.10	NA	<0.10	NA	<0.10	NA	<0.10	NA
Endrin	ug/L	NA	NA	NA	<0.10	NA	<0.1	NA	<0.1	NA	<1	NA	<0.10	<0.10	<0.10	NA	<0.10	NA	<0.10	NA	<0.10	NA
Endrin aldehyde	ug/L	NA	NA	NA	<0.10	NA	<0.1	NA	<0.1	NA	<1	NA	<0.10	<0.10	<0.10	NA	<0.10	NA	<0.10	NA	<0.10	NA
Endrin ketone	ug/L	NA	NA	NA	<0.10	NA	<0.1	NA	<0.1	NA	<1	NA	<0.10	<0.10	<0.10	NA	<0.10	NA	<0.10	NA	<0.10	NA
Heptachlor	ug/L	NA	NA	NA	<0.05	NA	<0.05	NA	<0.05	NA	<0.5	NA	<0.05	<0.05	<0.05	NA	<0.05	NA	<0.10	NA	<0.10	NA
Heptachlor epoxide	ug/L	NA	NA	NA	<0.05	NA	<0.05	NA	<0.05	NA	<0.5	NA	<0.05	<0.05	<0.05	NA	<0.05	NA	<0.05	NA	<0.05	NA
Methoxychlor	ug/L	NA	NA	NA	<0.5	NA	<0.5	NA	<0.5	NA	<5	NA	<0.50	<0.50	<0.50	NA	<0.50	NA	<0.05	NA	<0.05	NA
Toxaphene	ug/L	NA	NA	NA	<1	NA	<1	NA	<1	NA	<10	NA	<1.0	<1.0	<1.0	NA	<1.0	NA	<1.0	NA	<1.0	NA

Notes:
NA: No analysis.
ND: Not detected.
J: Data flag indicates an estimated value.

Table 5
Leachate Analytical Results
Blackwell Landfill NPL Site

Parameter	Units	LLSV8-01	LLDV5-01	Average	BW-LCS-01	BW-LCS-02	BW-LCS-03	BW-LCS-04	BW-LCS-05	BW-LCS-06	BW-LCS-07	BW-LCS-08	BW-LCS-09	BW-LCS-10	BW-LCS-11	BW-LCS-12	BW-LCS-13	BW-LCS-14	BW-LCS-15	BW-LCS-16	BW-LCS-17	BW-LCS-18
		Sep-91	Sep-91	Sep-91	Dec-97	Jan-98	Feb-98	Jun-98	Sep-98	Dec-98	Mar-99	Jul-99	Dec-99	Apr-00	Jul-00	Oct-00	Jan-01	Apr-01	Jul-01	Oct-01	Jan-02	Apr-02
Volatile Organic Compounds (Continued)																						
Styrene	ug/L	NA	NA	NA	<50	NA	<5	NA	<5	NA	<5	NA	<5	NA	NA	NA	NA	NA	<5	NA	[illegible]	
1,1,2,2-Tetrachloroethane	ug/L	NA	NA	NA	<50	NA	<5	NA	<5	NA	<5	NA	<5	<5	<5	NA	<5	NA	<5	NA	[illegible]	
Tetrachloroethene	ug/L	ND	ND	ND	<50	NA	<5	NA	<5	NA	5	NA	17.8	<5	<5	NA	<5	NA	<5	NA	[illegible]	
Toluene	ug/L	1,800	49	924.5	197	NA	117	NA	119	NA	192	NA	113	30.2	11.7	NA	24.6	NA	<5	NA	[illegible]	
1,1,1-Trichloroethane	ug/L	NA	NA	NA	<50	NA	<5	NA	<5	NA	<5	NA	<5	<5	<5	NA	<5	NA	<5	NA	[illegible]	
1,1,2-Trichloroethane	ug/L	NA	NA	NA	<50	NA	<5	NA	<5	NA	<5	NA	<5	<5	<5	NA	<5	NA	<5	NA	[illegible]	
Trichloroethene	ug/L	170	ND	85	23.7 J	NA	11.1	NA	6.2	NA	19	NA	15.4	<5	<5	NA	<5	NA	<5	NA	[illegible]	
Vinyl Acetate	ug/L	NA	NA	NA	<100	NA	<10	NA	<10	NA	<10	NA	<10	NA	NA	NA	NA	NA	<10	NA	[illegible]	
Vinyl Chloride	ug/L	ND	ND	ND	<100	NA	<10	NA	<10	NA	<10	NA	<10	<10	<10	NA	<10	NA	<2	NA	[illegible]	
Xylenes (total)	ug/L	260	400	330	175	NA	95.8	NA	186	NA	<5	NA	228	NA	NA	NA	NA	NA	<5	NA	[illegible]	
Semivolatile Organic Compounds																						
Acenaphthene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
Acenaphthylene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
Anthracene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
Benzidine	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
Benzo[a]anthracene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
Benzo[b]fluoranthene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
Benzo[k]fluoranthene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
Benzo[g,h,i]perylene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
Benzo[a]pyrene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	NA	NA	[illegible]	
Benzoic Acid	ug/L	NA	NA	NA	<250	NA	<50	NA	3,990	NA	15,400	NA	3,130	NA	NA	NA	NA	NA	<50	NA	[illegible]	
Benzyl Alcohol	ug/L	NA	NA	NA	<100	NA	<20	NA	<400	NA	<600	NA	200	NA	NA	NA	NA	NA	<20	NA	[illegible]	
bis(2-chloroethoxy)methane	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
bis(2-chloroethyl) ether	ug/L	ND	ND	ND	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
bis(2-chloroisopropyl) ether	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
bis(2-ethylhexyl) phthalate	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<6	NA	[illegible]	
4-Bromophenyl phenylether	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
Butylbenzylphthalate	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
4-Chloroaniline	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	NA	NA	NA	NA	NA	<20	NA	[illegible]	
4-Chloro-3-methylphenol	ug/L	ND	34	17	<100	NA	<20	NA	<400	NA	<600	NA	<200	<20	<20	NA	<20	NA	<10	NA	[illegible]	
2-Chloronaphthalene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
2-Chlorophenol	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
4-Chlorophenyl-phenylether	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
Chrysene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	NA	NA	[illegible]	
Dibenz[a,h]anthracene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	NA	NA	[illegible]	
Dibenzofuran	ug/L	ND	ND	ND	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
1,2-Dichlorobenzene	ug/L	ND	4	2	<50	NA	<10	NA	<200	NA	<300	NA	<100	NA	NA	NA	NA	NA	<10	NA	[illegible]	
1,3-Dichlorobenzene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
1,4-Dichlorobenzene	ug/L	ND	940	470	<50	NA	<10	NA	<200	NA	<300	NA	<100	27	12	NA	17	NA	<10	NA	[illegible]	
3,3-Dichlorobenzidine	ug/L	NA	NA	NA	<100	NA	<20	NA	<400	NA	<600	NA	<200	<20	<20	NA	<20	NA	<20	NA	[illegible]	
2,4-Dichlorophenol	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
Diethylphthalate	ug/L	ND	33	16.5	<50	NA	147	NA	<200	NA	<300	NA	<100	<10	12	NA	<10	NA	55	NA	[illegible]	
2,4-Dimethylphenol	ug/L	ND	10	5	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
Dimethylphthalate	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	55	NA	[illegible]	
Di-n-butylphthalate	ug/L	ND	ND	ND	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
4,6-Dinitro-2-methylphenol	ug/L	NA	NA	NA	<250	NA	<50	NA	<1,000	NA	<1,500	NA	<500	<50	<50	NA	<50	NA	<50	NA	[illegible]	
2,4-Dinitrophenol	ug/L	NA	NA	NA	<250	NA	<50	NA	<1,000	NA	<1,500	NA	<500	<50	<50	NA	<50	NA	<50	NA	[illegible]	
2,4-Dinitrotoluene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
2,6-Dinitrotoluene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
1,2-Diphenylhydrazine	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	<10	NA	ND	NA	NA	NA	[illegible]	
Di-n-octylphthalate	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
Fluoranthene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
Fluorene	ug/L	ND	ND	ND	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
Hexachlorobenzene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	NA	NA	[illegible]	
Hexachlorobutadiene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
Hexachlorocyclopentadiene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
Hexachloroethane	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
Ideno[1,2,3-cd]pyrene	ug/L	NA	NA	NA	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	NA	NA	[illegible]	
Isophorone	ug/L	ND	ND	ND	<50	NA	<10	NA	<200	NA	<300	NA	<100	<10	<10	NA	<10	NA	<10	NA	[illegible]	
2-Methylnaphthalene	ug/L	ND	ND	ND	<50	NA	<10	NA	<200	NA	<300	NA	<100	NA	NA	NA	NA	NA	<10	NA	[illegible]	
2-Methylphenol	ug/L	ND	ND	ND	<50	NA	<10	NA	<200	NA	<300	NA	<100	<50	<50	NA	<50	NA	<10	NA	[illegible]	

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Attachment 6

Table 6
Landfill Gas Analytical Results
Blackwell Landfill NPL Site

Sample Identification	Sample Collection Date	Atmospheric Pressure (in. Hg)	ASTM D1945/1946			U.S. EPA Modified Method 25C	
			% of CO_2 (%-v/v)	% of O_2 (%-v/v)	% of N_2 (%-v/v)	Methane ppm-c	Total Non-Methane Organic Compounds, as Methane ppm-c
FPD-LFGSTACK-01	9/15/98	29.97	33	0.51	1.90	550,000	1,400
BW-LFGSTACK-02	9/23/98	30.23	36	0.51	2.00	570,000	400
BW-LFGSTACK-03	10/27/98	30.14	35	0.53	2.00	570,000	900
BW-LFGSTACK-04	10/28/98	29.99	35	0.53	2.00	570,000	710
BW-LFGSTACK-05	11/24/98	30.14	39	0.47	2.30	570,000	39
BW-LFGSTACK-06	11/25/98	29.76	38	0.96	3.40	560,000	22
BW-LFGSTACK-07	3/24/99	30.20	34	0.93	5.00	580,000	1,200
BW-LFGSTACK-08	3/31/99	29.43	34	1.10	4.60	580,000	1,200
BW-LFGSTACK-09A	8/13/99	29.7	34	0.98	2.70	650,000	1,100
BW-LFGSTACK-10A	8/18/99	30.08	33	0.76	2.30	650,000	1,200
BW-LFGSTACK-11A	1/4/00	29.92	37	0.71	ND	690,000	1,700
BW-LFGSTACK-12A	1/14/00	30.72	35	2.80	8.30	630,000	1,500
BW-LFGSTACK-13A	6/19/00	30.11	34	0.20	8.30	640,000	1,900
BW-LFGSTACK-14A	6/28/00	30.02	31	0.60	12.00	590,000	830
BW-LFGSTACK-15A	10/16/00	30.18	34	0.73	7.20	640,000	1,900
BW-LFGSTACK-16A	1/4/01	29.97	33	0.60	7.20	600,000	1,300
BW-LFGSTACK-17A	4/2/01	30.17	33	0.21	8.10	590,000	1,300
BW-LFGSTACK-18A	6/29/01	30.06	32	0.19	5.90	620,000	1,000
BW-LFGSTACK-19A	10/4/01	30.02	34	0.22	3.80	620,000	1,700
BW-LFGSTACK-20A	12/12/01	30.02	33	0.35	6.20	600,000	1,700
BW-LFGSTACK-21A	4/3/02	30.29	32	ND	12.00	570,000	1,400
Averages	-	30.04	34	0.69	5.36	601,905	1,162

Notes:
in. Hg: Inches mercury.
%-v/v: Percent by volume.
ppm-c: Parts per million - carbon
ND: Not detected

MBM/rhs
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Attachment 7

EXECUTIVE SUMMARY - Detection Highlights

E3D150182

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
BW-LFG STACK-25A 04/11/03 10:45 001				
Methane	520000	3.4	ppm-c	CFR60 EPA 25C Mod
TNMOC as Methane	1000	51	ppm-c	CFR60 EPA 25C Mod
Carbon dioxide	31	0.017	%(v/v)	ASTM D1945
Nitrogen	13	1.7	%(v/v)	ASTM D1945
Oxygen	2.5	0.17	%(v/v)	ASTM D1945
Specific Gravity	0.92			ASTM D3588
Heat of Combustion	540	1.0	B TU/FT3	ASTM D3588

ANALYTICAL METHODS SUMMARY

E3D150182

PARAMETER	ANALYTICAL METHOD
EPA 25C Modified	CFR60 EPA 25C Modified
Heat of Combustion and Re lative Density	ASTM D3588
Natural Gas by GC	ASTM D1945
Specific Gravity	ASTM D3588

References:

ASTM Annual Book Of ASTM Standards.

CFR60 "Test Methods," 40 CFR, Part 60, July 1, 1997

Attachment 8

Applicable or Relevant and Appropriate Requirements				
Federal ARARs				
Authority	**ARAR**	**Status**	**Requirement Synopsis**	**Action to be taken to Attain ARAR**
SDWA	40CFR 141.11 - 16; 141.50-51; and 143.3	Relevant and appropriate	Standards (MCLs) have been adopted as enforceable standards for public drinking water systems; goals (MCLGs) are non-enforceable levels for such systems.	MCLs and non-zero MCLGs will be attained at the point of compliance. Remediation of contaminated materials will eliminate ongoing discharges to groundwater.
CAA	40CFR Part 50	Applicable	Requirements include the TSP standard for air discharges. Treatment methods which are part of the remedy are potential sources of fugitive dust, particles, and/or VOCs	Remediation technologies which emit air contaminants will attain the appropriate standard during operation
Floodplain Management Act	Executive Order 11988, 40 CFR 6, Appendix A, Section 6(a)(5)	Applicable	Requires minimization of potential harm to or within flood plains	Any work within the floodplain area occupied by the site will have to meet the requirements of this Executive Order
Wetland Management	Executive Order 11990	Applicable	Requires federal agencies to avoid to the extent practicable, long- and short-term adverse impacts associated with the destruction of wetlands.	All work in wetland near the landfill will meet the requirements of this Executive Order.

Authority	ARAR	Status	Requirement Synopsis	Action to be taken to Attain ARAR
CWA	40 CFR 230.70-77	Applicable	Requires actions to minimize adverse effects of dredged or fill materials	Actions will be take to comply with all provisions of this regulation
Fish and Wildlife Coordination Act		Applicable	Requires federal agencies to action to protect fish and wildlife resouces that may be affected by stream or water modifications.	Actions will be taken to comply with all provisions of this regulations
OSHA	29 CFR 1910 and 1926	Applicable	TLVs are required to be monitored in the breathing zone during construction	All construction activities will comply with these regulations.
CAA Section 112	40 CFR 61.12 - 14	Applicable	Requires that emissions of hazardous pollutants do not exceed levels from sources in compliance with hazardous air pollution regulations.	Actions will be taken to ensure that air quality and emissions limitations for landfill gas are met.
NPDES	40 CFR 122 and 125	Applicable	Governs off-site treatment and disposal of leachate	Treatment of leachate disposed of off-site will comply with these regulations
STATE ARARS				
Illiniois Administrative Code (IAC)	35 IAC 620.410 and 450	Relevant and Appropriate	Sets groundwater quality standards for potable groundwater resources	The remedy shall achieve the standards established at the point of compliance for the site
IAC	35 IAC 243	Relevant and Appropriate	Sets emission standards for photochemically reactive organic material	Emissions from the landfill shall not exceed these standards.

Authority	ARAR	Status	Requirement Synopsis	Action to be taken to Attain ARAR
IAC	35 IAC 811 and 35 IAC 724	Applicable	Sets standards for construction within a 100 year floodplain	Any work within the 100 year floodplain shall comply with these regulations
IAC	92 IAC 708	Applicable	Governs construction and filling in the regulatory floodway of rivers, lakes and streams	Any work occurring within a floodway shall comply with these regulations.
IAC	35 IAC 807 and 811	Relevant and Appropriate	Establishes minimum requirements for maintenance and inspection fo final cover and minimum requirements for groundwater and landfill gas monitoring	All post closure activities will comply with these regulations.
IAC	35 IAC 811, 206, 308, and 309	Relevant and Appropriate	Sets regulation for the sampling, collection and storage for leachate	The TSD of leachate from the site will meet these requirements.
IAC	35 IAC 218, 807, and 811	Relevant and Appropriate	Regulations dealing with monitoring landfill gas	All landfill gas monitoring shall comply with these regulations